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## PLATE 2.

- FIG. 1.** AMBLYOPSIS SPELAEUS DeKay. Natural size.  
 1a. Stomach and pyloric appendages. Twice natural size.  
 1b. Scale, magnified.  
 1c. Abdominal cavity, showing position of stomach and single ovary. Natural size.
- FIG. 2.** CHOLOGASTER CORNUTUS Agassiz. Natural size.  
 2a. Stomach and pyloric appendages. Twice natural size.  
 2b. Scale, magnified.  
 2c. Abdominal cavity, showing stomach and single ovary behind the stomach. Twice natural size.
- FIG. 3.** TYPHLOCHEI THYS SUBTERRANEUS Girard. Natural size.  
 3a. Stomach and pyloric appendages. Twice natural size  
 3b. Scale, magnified
- FIG. 4.** CHOLOGASTER AGASSIZII Putnam. Natural size.  
 4a. Stomach and pyloric appendages. Twice natural size.  
 4b. Scale, magnified.

The scales figured on the plate are all from the second or third row under the dorsal fin. 4 b is represented with the posterior margin *down*, all the others are represented with the posterior margin on the *left*. The natural size of the scales is given by the minute outline at the left of the figures above each scale; 4 b is so small that the natural size can hardly be represented by the black dot.

## NOTE TO ARTICLE IN DECEMBER NUMBER, BY A. S. PACKARD, JR.

Since my article was printed, Prof. Cope's article entitled "Life in the Wyandotte Cave" has appeared in the "Annals and Magazine of Natural History" (London) for November. He enumerates the following articulates as inhabitants of this cave; "*Anophthalmus Tellkampfii*, and another species; two species of Staphylinidae; Raphidophora; two species of flies; an Aranea-like and Opilio-like spider; a species of Pseudotremia; *Cambarus pellucidus*, an unknown aquatic Crustacean with external egg pouches, and a Lernaeon (crustacean) parasitic on the blind fish. Of these one beetle (*Anophthalmus*), the cricket (Raphidophora), a fly, the Opilio-like spider, the centipede, and the blind crawfish, are probably the same as those found in the Mammoth Cave. Two beetles and two crustaceans are certainly different from those of the latter, and the centipedes are much more numerous. The Gammaroid crustacean found in the waters of the Mammoth Cave, and which is, no doubt in part, the food of the blind fish, we did not find; but some such species no doubt exists, as we found an abundance of a lively little tetrade-capod crustacean near the mouth of a cave close by."

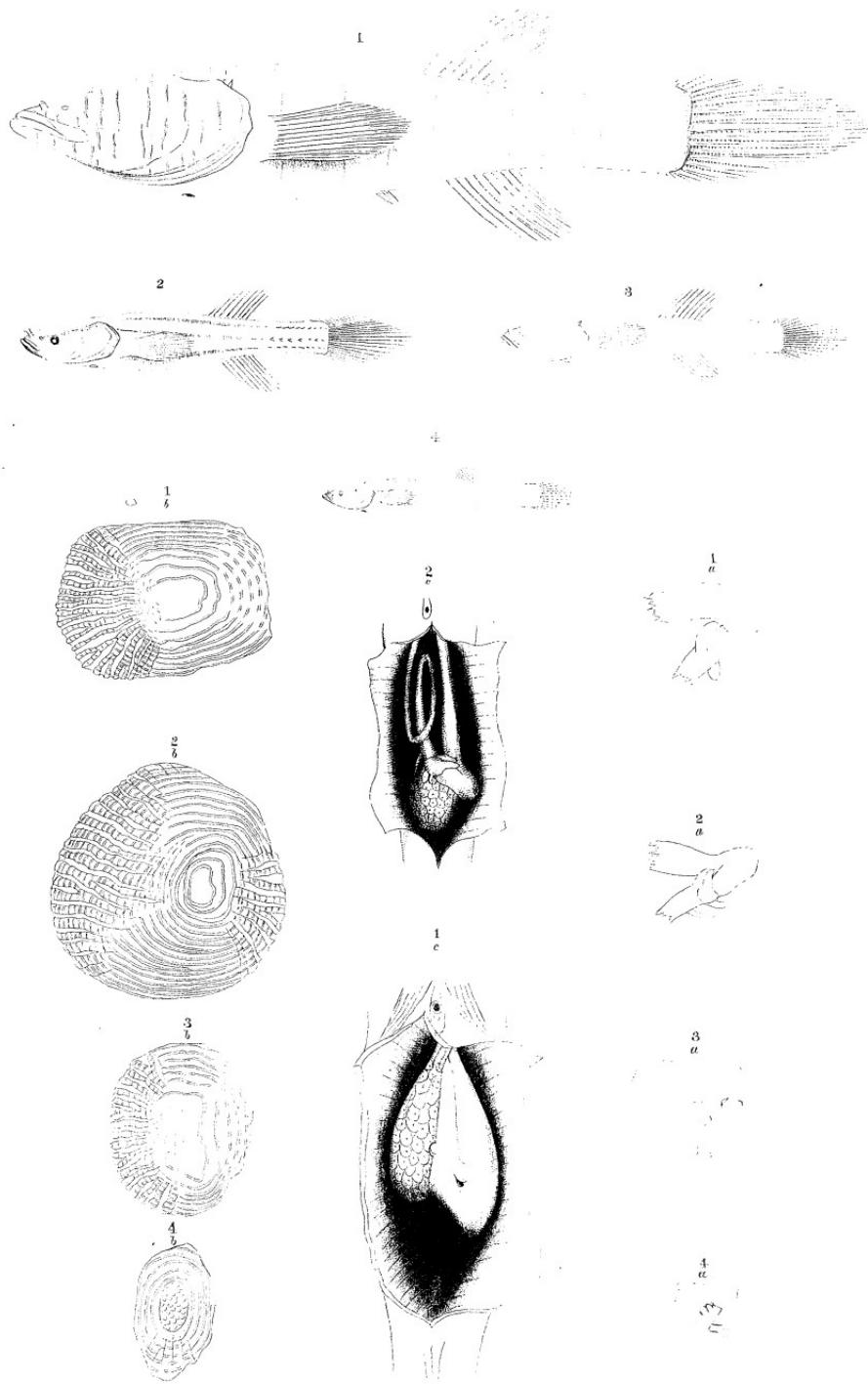
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### A NEW ERECTING ARRANGEMENT, ESPECIALLY DESIGNED FOR USE WITH BINOCULAR MICROSCOPES.

BY R. H. WARD, M.D.

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FOR dissecting and other manipulations under magnifying powers, the simple microscope is awkward and unsatisfactory, and has been made to serve as a binocular only with low powers; but the superb field of the compound microscope has been comparatively little used for these purposes because few persons can work to advantage under an inverting arrangement, the erectors usually



furnished are not good, and the use, otherwise satisfactory, of a good objective as an erector has not as yet afforded the advantage of binocular vision. The simple expedient now proposed is designed to increase the usefulness of the stereoscopic binoculars in ordinary use by rendering them easily available for purposes which require an erect image.

Last summer I proposed, at the Indianapolis meeting of the American Association, to place, for certain purposes, an erecting objective below instead of above the regular objective of the microscope. Then, of course, the regular objective becomes the erector, and the accessory one below acts as the objective. This simple expedient, applied to Wenham's or other non-erecting binoculars, leaves little to be desired for the purposes of a dissecting microscope. As a simple contrivance, the lenses of a one-and-a-half or two-inch objective (preferably a solid or single-combination one) may be packed or screwed into the upper end of an adapter which when screwed into the nose-piece of the microscope carries them up close to the binocular prism, and into the lower end of which, lengthened more or less by two or three adapters of various lengths, the object glass may be screwed. A more elegant but scarcely more satisfactory arrangement is an adapter with sliding-tube adjustment which varies to the extent of an inch or more the distance between the erector and objective. Different powers and distances will of course be used according to the wants of different observers. The combination which has proved most convenient in my hands consists of a two-inch erecting lens close to the binocular prism, and a two-thirds objective at a distance, measured to its lowest end, of from three to four and a quarter inches below the erector; giving powers of ten to fifty diameters, and requiring a working distance between the stage and the binocular prism of four and one-half to five inches, which is quite practicable with large stands. A shorter working distance may be gained at a slight disadvantage. With a two-inch erector and four-tenths inch objective, powers of eight to fifty diameters can be secured without removing the binocular prism more than four inches from the stage; and with a one-inch erector and two-thirds inch objective a power of forty diameters is obtained with the binocular prism three and three-fourths inches from the stage. When, however, sufficient working distance cannot be obtained, the object may sometimes be placed upon the substage, or, oftener,

the substage removed and the body racked down so as to focus through the empty stage upon the table, a block or box, or an extemporized stage occupying the usual position of the mirror and illuminated by the mirror after the method suggested by Mr. James Smith. In this case it is desirable to increase the working distance between the prism and the object by varying the lenses employed. Thus a one-and-a-half-inch objective at from three and three-fourths to five and three-fourths inches from the erector will give powers of six to fifty diameters and working distance from prism of seven to ten inches. The erector may also be removed an inch or more from the prism. When this latter arrangement is to be used exclusively, placing the object at from eight to ten or twelve inches from the prism, as in many students' microscopes, the apparatus is further simplified by screwing a two-inch objective into the nose-piece in its usual position, as an erector, and screwing or sliding over it an adapter carrying a-one-and-a-half or two-inch objective from four to six inches lower down. Some contrivance is required to illuminate transparent objects under the lower powers; but opaque and translucent objects on a black ground can be dissected and manipulated with great facility.

The same erecting arrangement can be used in connection with monocular microscopes that have no draw-tube and therefore cannot use an erector in the usual position. It may also be used as a means of working Wenham's and other binoculars, with high powers. With powers of five hundred or one thousand diameters, however, it is still difficult to obtain good definition or to fully light both fields.

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## THE RATTLESNAKE AND NATURAL SELECTION.

BY PROF. N. S. SHALER.

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FOR some years I have been teaching that the tail appendage of the rattlesnake was not to be explained on the doctrine of natural selection, inasmuch as it could contribute in no way to the advantage of the animal. It seemed to me quite clear that it was rather calculated to hinder than to help the creature in the race of life by warning its prey of its presence. Nor did it seem easy to ac-